$$\sum_{j}^{k} F_j = 1 \tag{3}$$

wherein F, j and k are as defined above.

[0063] The refractivity of the purge gas for wavelength λ_1 is given by:

$$\sum_{j}^{k} F_j \alpha_{j1} = \alpha_{m1} \tag{10}$$

[0064] For wavelength λ_2 said refractivity is given by:

$$\sum_{j}^{k} F_j \alpha_{j2} = \alpha_{m2} \tag{11}$$

and for λ_3

$$\sum_{j}^{k} F_j \alpha_{j3} = \alpha_{m3} \tag{12}$$

with the condition that

$$\sum_{j}^{k} F_j = 1 \tag{3}$$

[0065] Different purge gas compositions can be calculated by combining equations (10), (11) and (12) with the condition that equations (3), (4) and (5) must be fulfilled. For more information with regard to refractivity see, for example, Max Born & Emil Wolf, Principles of optics, electric theory of propagation interference and diffraction of light, sixth edition, Pergamon Press Oxford, incorporated herein by reference.

[0066] Suitable mixtures of gases include mixtures of two or more components having different refractivities. For example, the purge gas may comprise one or more components having a refractivity of less than 3×10^{-4} at a wavelength of from 200 to 700nm and one or more components having a refractivity of greater than 3×10^{-4} at a wavelength of from 200 to 700nm. Typically, the one or more components having a refractivity of less than 3×10^{-4} at a wavelength of from 200 to 700nm will be present in an amount of from 50 to 99% by volume and the one or more components having a refractivity of greater than 3×10^{-4}

Table 2:

Example	N_2	He	Ne	Ar	Kr	Xe
6	66.4	12.7			20.9	
7	60.7		15.9		23.4	
8		9.5		67.6	23.0	
9			12.1	63.1	24.8	
10	87.1	8.8				4.2
11	84.9		10.6			4.5
12		3.9		91.4		4.8
13			4.7	90.4		4.9

Embodiment 3

[0061] In the third embodiment of the invention, which is the same as the first embodiment except as described below, a second harmonic interferometric device is used to adjust the measurements of the displacement interferometer to account for variations in temperature and pressure. The second harmonic interferometric device is described in Embodiment 2 above. In this third embodiment, the response of the overall interferometric system is adjusted to account for purge gas contamination. This is achieved by off-setting the errors caused by purge gas contamination in each of the two interferometric devices.

[0062] In this embodiment, at least two components make up the purge gas, and the following equation must be substantially fulfilled:

$$\frac{\alpha_{m1}}{(\alpha_{m3} - \alpha_{m2})} = K_a \qquad (4)$$

wherein α_{m1}, α_{m2} and α_{m3} are as defined above; and

$$K_a = \frac{\alpha_{a1}}{(\alpha_{a3} - \alpha_{a2})} \qquad (5)$$

wherein α_{a1}, α_{a2} and α_{a3} are as defined above. As for embodiments 1 and 2, the sum of the gaseous fractions must equal 1, thus